REDUCING CHEMICAL, BIOLOGICAL AND RADIOLOGICAL VULNERABILITY THROUGH DESIGN

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REDUCING CBR VULNERABILITY THROUGH DESIGN

CBR, NBC, B/C, WHAT IS IT?

THREAT CHARACTERISTICS:

CHEMICAL AGENTS - TYPES, DISSEMINATION METHODS, DURATION
THREAT TO AIR VEHICLE CREW OR EQUIPMENT?

BIOLOGICAL AGENTS - TYPES, DISSEMINATION METHODS, DURATION
THREAT TO AIR VEHICLE CREW OR EQUIPMENT?

NUCLEAR - THREAT TO AIR VEHICLE OR CREW?

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CBR SURVIVABILITY REQUIREMENTS:

- RELATIVELY NEW

- NOT MANDATED FOR PREVIOUS SIKORSKY AIR VEHICLES

- RAH-66 COMANCHE IS THE FIRST HELICOPTER DEVELOPED WITH CBR REQUIREMENTS SPECIFIED IN THE PERFORMANCE WEAPON SYSTEM SPECIFICATION

- RAH-66 REQUIREMENTS FOCUSED ON:

  MATERIAL RESISTANCE TO CBR CONTAMINANTS AND DECONTAMINANTS

  COCKPIT/AVIONICS PROTECTION

  DECONTAMINATION

  DETECTION

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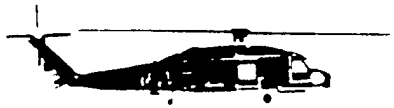
CBR RESISTANCE NOT A DESIGN REQUIREMENT

UH-60A
UH-60L
MH-60K



HH-60K
SH-60B
SH-60F
HH-60J

HH-53B
HH-53C
CH-53C
HH-53H
MH-53J

CH-53E
MH-53E

CBR HARDEN DESIGN BASED ON PWSS REQUIREMENTS

RAH-66

659

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RAH-66 COMANCHE NBC SURVIVABILITY FEATURE OVERVIEW

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OBJECTIVE:

IMPROVE AIR VEHICLE SURVIVABILITY THROUGH THE INCORPORATION OF DESIGN FEATURES WHICH WILL ENHANCE THE SYSTEM'S ABILITY TO EFFECTIVELY CONDUCT OPERATIONS IN A CBR CONTAMINATED ENVIRONMENT

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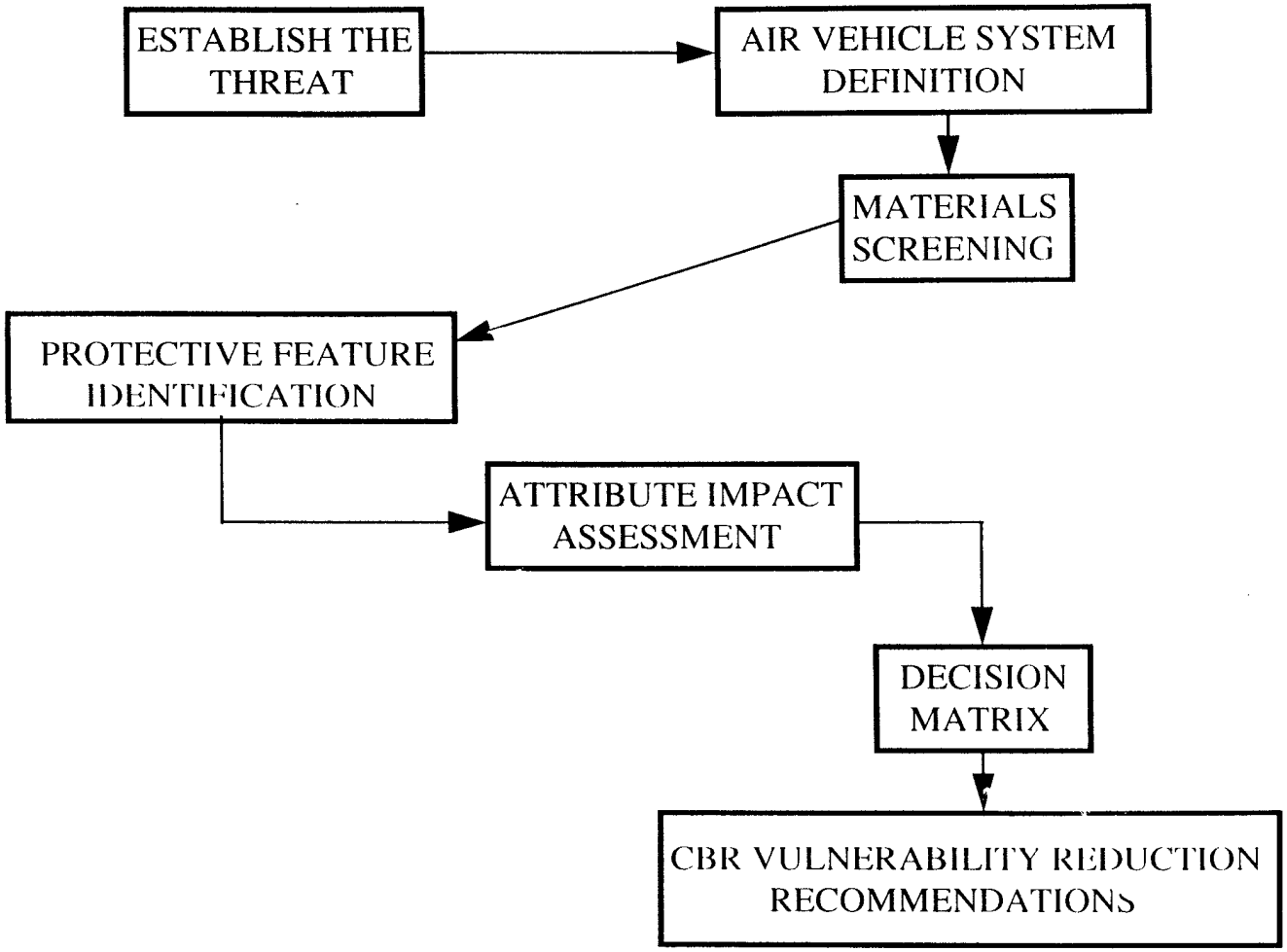
APPROACH TO CONDUCTING A SYSTEM CBR VULNERABILITY ASSESSMENT:



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AIR VEHICLE SYSTEM DEFINITION:

ACQUIRE DETAILED INFORMATION ON ALL VEHICLE SYSTEMS, SUBSYSTEMS, AND COMPONENTS, INCLUDING AN UNDERSTANDING OF HOW EACH OPERATES

DETERMINE CRITICALITY - FLIGHT CRITICAL
MISSION CRITICAL
NOT FLIGHT OR MISSION CRITICAL

DETERMINE LOCATION OF SYSTEM, SUBSYSTEM, OR COMPONENT ON OR WITHIN THE AIR VEHICLE

REGIONALIZE THE AIR VEHICLE TO FACILITATE ASSESSMENT

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MATERIALS SCREENING:

SCREEN ALL MATERIALS FOR CBR CONTAMINATION AND DECONTAMINATION RESISTANCE

UTILIZE EXISTING PARTS LISTS TO DETERMINE MATERIAL TYPES USED FOR ALL SYSTEMS AND COMPONENTS BEING ASSESSED

CATEGORIZE AS SUSCEPTIBLE TO CBR DAMAGE OR NON-SUSCEPTIBLE DUE TO INHERENT MATERIAL QUALITIES

DETERMINE LEVEL OF POTENTIAL DEGRADATION - FULLY MISSION CAPABLE, PARTLY MISSION CAPABLE, NOT MISSION CAPABLE

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PROTECTIVE FEATURE IDENTIFICATION:

ESTABLISH RECOMMENDATION MATRIX FOR PROVIDING ENHANCED PROTECTION FEATURES AND ALTERNATIVES BASED ON:

- LOCATION - SYNERGISTIC PROTECTION PROVIDED
- CAN THREAT PHYSICALLY CONTACT PART UNDER NORMAL OPERATING CONDITIONS?
- MATERIAL CHANGE
- PROTECTIVE COATING
- RELOCATE AND PROVIDE ENVELOPE PROTECTION
- ENHANCE DETECTION CAPABILITIES TO REDUCE VULNERABILITY THROUGH AVOIDANCE

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PROTECTIVE FEATURE IDENTIFICATION:(CONT.)

- IDENTIFY SUSCEPTIBLE MATERIALS WHICH CANNOT BE PROTECTED AND ALERT CUSTOMER TO FOLLOWING POSSIBILITIES:
  - DEGRADATION WILL OCCUR FOLLOWING EXPOSURE
  - REPLACEMENT MANDATED AFTER EACH OCCURRENCE
  - CANNOT BE DECONTAMINATED
  - ADDED LOGISTICAL BURDEN
- ENSURE PRIMARY DESIGN FUNCTION OF THE SYSTEM OR COMPONENT IS NOT ADVERSELY AFFECTED BY THE INCORPORATION OF ANY CBR PROTECTIVE FEATURE

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ATTRIBUTE IMPACT ASSESSMENT:

ESTABLISH A RELATIVE IMPACT ASSESSMENT MATRIX WITH RESPECT TO KEY ATTRIBUTES SUCH AS:

- POWER REQ'TS
- WEIGHT
- VOLUME
- LOGISTICS EFFECTS
- MAINTENANCE EFFECT
- MISSION EFFECTIVENESS
- CHEMICAL RESISTANCE IMPROVEMENT OVER BASELINE
- BALLISTIC TOLERANCE
- COOLING REQ'TS
- COST
- MOPP IV COMPATIBILITY
- REPAIRABILITY EFFECT
- DECONTAMINATION EFFORT

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DECISION MATRIX:

ASSESSMENT RESULTS ARE COMPILED INTO A PROTECTION FIGURE-OF-MERIT CHART

THIS CALCULATION PROCESS RELATES A PROTECTIVE DESIGN FEATURE TO THE NUMBER OF PARTS PROTECTED VS THE TOTAL NUMBER OF PART TYPES ASSESSED

THIS CHART ASSISTS IN DETERMINING WHICH FEATURES OFFER THE GREATEST POTENTIAL FOR CBR VULNERABILITY REDUCTION

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RECOMMENDATIONS:

DEVELOP A CBR PROTECTIVE FEATURE "WISH" LIST FOR THE SPECIFIC SYSTEM

FOR AIR VEHICLES UNDER DEVELOPMENT THIS LISTING WOULD BE USED TO SUPPORT THE PRELIMINARY DESIGN PROCESS

ON MATURE AIR VEHICLE SYSTEMS THE LISTING WOULD BE UTILIZED TO SUPPORT A PHASED UPGRADE APPROACH CONSIDERING TIME AND FUNDING PROFILES

IN BOTH CASES THE LISTING WOULD SUPPORT TRADE-OFF STUDY EFFORTS AND MEASURE-OF-EFFECTIVENESS STUDIES

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SUMMARY:

TAILOR THE CBR PROTECTIVE FEATURES TO PROVIDE AN OPTIMIZED LEVEL OF PROTECTION FOR THE SPECIFIC AIR VEHICLE DESIGN AND THE PRIMARY MISSION PROFILES IT IS DESIGNED TO CONDUCT

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